The Effect of Multimedia Gosses on L2 Listening Comprehension

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Abstract

The present study examined the effect of multimedia glosses on foreign language listening comprehension. To this end, 94 male students studying at Rasa English Institute in Tehran were selected for the treatment. The participants consisted of three groups, and each group was randomly assigned to one of the following treatment conditions: textual, pictorial, and textual-pictorial glossing. They were given a vocabulary pre-test before the treatment. The purpose of this test was to exclude the words which were already familiar to the participants from the posttests. Meanwhile, a listening comprehension post-test was administered at the end of the treatment period. To investigate the effect of multimedia glosses on listening comprehension, the data obtained from the listening comprehension post-test were analyzed using one-way ANOVA. The result showed that textual-pictorial glosses had a significant effect on listening comprehension. The findings of this study may have implications for language learners, teachers, researchers, and materials developers.

Keywords: Vocabulary Learning, Glosses, Multimedia Glosses, CALL, Listening Comprehension

1. Introduction

Vocabulary is considered as the building block of language (Schmitt, Schmitt, & Clapham, 2001) and one of the most important aspects of foreign language learning (Knight, 1994). As Alemi and Tayebi (2011) put it, vocabulary, as a key component of language proficiency, forms the basis for learners' performance in other skills. On the other hand, most L2 learners may get into difficulties in processing L2 listening input due to the fact that, unlike other skills, the medium involved is temporary, and it is the speaker who controls the speed and content in listening (Graham, 2006). Meanwhile, Underwood (1989) believes that limited vocabulary size is a factor that contributes to the problematic nature of L2 listening comprehension. Therefore, glossing could be one of the learning techniques which can facilitate L2 vocabulary learning.

Glosses refer to short definitions, explanations, or translations of words or phrases which are unfamiliar to readers (Richgels & Mateja, 1984). According to Lomicka (1998), glosses were traditionally defined as "a short definition or note in order to facilitate reading and comprehension processes for L2 learners '' (p. 41). Glosses can help foster vocabulary learning in several ways. First, glosses provide accurate meanings for words, and are, therefore, easier to use than dictionaries (Hulstijn, Hollander, & Greidanus, 1996). Second, a gloss that is bold-faced draws learners' attention to L2 words, leading to consciousness-raising and input- enhancement (Nagata, 1999). Third, glosses also connect word forms to meanings (Nagata, 1999). Glossing, as one of the second language vocabulary learning techniques, may be used in different types, forms and positions (Zarei & Hasani, 2011). Glosses can be classified into three categories: L1 and L2 glosses, which are traditional ways of glossing (Chun & Plass, 1996) and computer-based or multimedia glosses, in which information is presented in more than one mode, such as pictures and words (Mayer, 1997).

Multimedia glosses are electronic glosses that are presented in the form of texts, pictures, sounds, and videos leading to better and more effective vocabulary learning (Roby, 1999). Multimedia settings provide a rich environment for comparing the possible effect of glosses as they can integrate multiple forms of media such as sound, pictures, and animation (Lomicka, 1998). As a result of integrating multimedia glosses into computer software, Computer Assisted Language Learning (CALL) emerged (Hong, 2010). CALL includes, among other things, pictures and words; therefore, it facilitates learning and increases vocabulary size (Mayer & Moreno, 2002).

Several studies (some of which have been reviewed in the present study) have investigated various aspects of the variables under investigation here, including glossing, multimedia-based learning, and listening comprehension. However, there appears to be a paucity of research on the effect of different types of multimedia glosses on L2 listening comprehension. The present study is an attempt to address this paucity. More specifically, it addresses the following research question:

Are there any significant differences among the effects of different types of multimedia glosses on L2 listening comprehension?

2. Review of Literature

Oxford Advanced Learners' Dictionary (2010) defines a gloss as a note or comment added to a piece of writing to explain a difficult word or phrase. Similarly, According to Shiki (2008), a gloss is any definition or explanation of words presented on the margins of the reading passages that assists learners in comprehending the meaning of unfamiliar words. As Jacobs, Dufon, and Fong (1994) put it, glosses can be used as one of the strategies to improve vocabulary knowledge. Otto and Hayes (1982) regard glossing as adjunct aids and state that the terms gloss and glossing have to do with the systematic use of marginal notes

and other extra-text notations whose primary function is to attract readers' attention while they are engaged in reading. According to Roby (1999), glosses provide readers with what seems to be deficient in their procedural or declarative knowledge.

According to Nation (2001), L2 learners can be exposed to complicated texts if they are provided with glosses. He further notes that glosses present accurate meanings for words that learners might not be able to guess and, therefore, prevent minimal interruption during the reading process. Bowles (2004) regards glosses as substitutes for the dictionary. He also believes that glosses do not interrupt the comprehension of a text as learners simply have access to the definitions in the text. Meanwhile, glosses result in incidental vocabulary learning. Ko (2005) lists the advantages of glossing as follows: 1. Glosses assist readers in comprehending new words more effectively as they prevent them from wrong guessing. 2. Glossing leads to minimal interruption during the process of reading. 3. By using glosses, readers can establish a link between background knowledge and new information in the text. 4. Glosses help readers to be autonomous and independent of the teacher.

Roby (1999) introduces a taxonomy of glosses based on the following six features: 1. Gloss authorship: it has to do with glosses generated by learners or professionals like instructors or material developers. 2. Gloss presentation: it includes priming glosses or prompting glosses. 3. Gloss function: it involves procedural functions (metacognitive, high lighting, and clarifying) and declarative functions (encyclopedia and linguistic). 4. Gloss focus: it deals with textual or extra-textual materials. 5. Gloss language: it consists of L1, L2, and L3. 6. Gloss form: it has to do with verbal, visual (image, icon, video with or without sound) and audio form. As Zarei and Hasani (2011) put it, glosses can be classified based on form, position, and language. They consider another classification of glossing: single versus multiple-choice glosses and meaning

inferred versus meaning given ones. According to Mayer (1997), computer-based or multimedia glosses are another type of glossing in which information is presented in more than one mode, such as pictures and words. As Yosshi (2006) notes, glosses can be combined with multimedia forms like pictures, videos, and sounds.

Multimedia is the result of integrating different types of media in a single application (Hasebrook, 1997). Mayer and Moreno (2003) define multimedia learning as "learning from words and pictures" and multimedia instruction as "presenting words and pictures that are intended to foster learning" (p. 43). Multimedia provides learners with the opportunity to gain control over their interaction with multimedia information (Plass & Jones, 2005), which would result in learner autonomy (Murray, 1999). Wolfe (2002) lists the following advantages of multimedia annotations. First, multimedia annotations enhance comprehension of materials. Second, they provide learners with the chance to review the lesson or multimedia annotations. Third, they facilitate critical thinking. Fourth, they provide learners with the opportunity to interpret and comment on annotations. Finally, multimedia annotations can record learners' intermediate and unselfconscious reactions to the text they are engaged in.

Computer-assisted Language Learning (CALL) is the result of integrating computer and multimedia technology into the field of language learning (Hong, 2010). CALL plays a vital role in second language learning as it facilitates the learning process by providing L2 learners with audio-visual presentations that meet the needs and interests of individuals or groups of learners (Rezaee & Sharbafshoar, 2001). Yeh and Wang (2003) consider CALL an effective method leading to an increase in learners' vocabulary size due to its capacity for glossing annotation. According to Tabatabaei and Shams (2011), CALL provides a new dimension for language teaching, language learning, and vocabulary acquisition.

The Dual Coding Theory and the Generative Theory lay the foundation of multimedia learning. According to the Dual Coding Theory of Clark and Paivio (1991), cognitive processing takes place within two verbal and visual systems. The verbal system is concerned with the language system, while the nonverbal system deals with nonlinguistic events. Based on this theory, both verbal and visual systems are responsible for cognitive processing; in fact, employing both verbal and visual systems simultaneously results in a better process of learning than when words are coded in a single manner.

The Generative Theory of Mayer (1997) states that multimedia instruction should be based on meaningful learning. Within this theory, the learner is regarded as a knowledge constructor who selects and connects some parts of visual and verbal knowledge. The design of multimedia settings also plays a vital role in the learners' engagement in the cognitive processes, which are essential for effective and meaningful learning within the verbal and visual information processing systems. According to this theory, meaningful learning occurs as a result of paying attention to relevant aspects of visual and verbal information received through eyes or ears; in fact, the first step has to do with selecting the related material and entering it to working memory. Learners organize the selected material in a coherent way in the second step. Finally, learners make connections between verbal-based and visual-based models; this is known as the integrating step.

Several studies have been conducted on the effects of glosses and multimedia on the learning of different aspects of language. In one such study, Nagata (1999) examined the effects of multiple-choice glosses on vocabulary and grammar learning of American learners of Japanese. The findings showed that glossing had a significantly positive effect on both vocabulary and grammar learning. In a similar study, Lin and Huang (2008) concluded that both meaning-inferred and meaning-given glosses positively influence vocabulary learning. In

another study, Xu (2010) reported that L1 glosses were more effective than L2 glosses on immediate vocabulary recall, whereas a combination of L1 and L2 glosses were more effective on delayed recall of words.

Yoshii (2006) examined the effect of different types of L1 and L2 glosses on L2 vocabulary learning in a multimedia environment and concluded that L1 textual glosses result in better vocabulary retention than both L2 textual glosses and L2 textual-pictorial glosses. Likewise, Akbulut (2006), who studied the effect of hypermedia glosses on reading comprehension, reported that such glosses significantly affect reading comprehension. His finding confirmed those of Lomicka (1998), whose finding suggested the effectiveness of multimedia glosses on reading comprehension. Similar results were reported by Yanguas (2009) about the effect of multimedia glosses on both vocabulary learning and text comprehension.

In the Iranian context, Zarei and Hasani (2011) explored the effect of different glossing conventions, including marginal, pre-text, post-text, and interlinear glosses in L1 and L2 on vocabulary learning. The result showed that in the case of interlingual glosses, both pre-text and marginal groups outperformed the post-text group. In another study, Zarei and Mahmoodzadeh (2014) examined the effects of multimedia glosses (textual, pictorial and textual-pictorial) on reading comprehension and vocabulary recall. The analysis of data suggested that while multimedia gloss groups outperformed the comparison group, there was no significant difference among the three glossed groups.

In one of the rare studies on the effect of multimedia on listening comprehension, Brett (1997) compared the effect of different media (audio, video, and multimedia) and concluded that the use of multimedia resulted in better listening comprehension than both audio and video modalities.

The above quick review of the related literature suggests that different aspects of glossing have been examined. However, there appears to be a paucity

of research as to whether, and to what extent, multimedia glosses affect EFL learners' listening comprehension. The present study is aimed at partially bridging this gap.

3. Method

3.1. Participants

The present study was conducted initially with 115 male students studying at Rasa English Institute in Tehran. To homogenize the students in terms of their listening comprehension, the standard listening test of PET was administered to them. Based on their performance on the test, from among the 115 participants, 97 students whose scores fell between one standard deviation above and below the mean were selected. At the end of the treatment, three other participants were excluded as they had not taken part in the listening comprehension post-test. So, the final number of participants was 94. The participants were randomly assigned to three groups, namely pictorial, textual and textual-pictorial glossing. All of the participants were non-native speakers of English and at the intermediate proficiency level. The range of their ages was between 13 and 15.

3.2. Materials and Instruments

The following materials and instruments were used for the purpose of treatment and data collection:

3.2.1. Standard Listening Test of PET

Two standard listening tests of PET including 25 multiple-choice items were used as listening pre-test and listening post-test. The reliability (internal

consistency) index of the listening pre-test and listening post-test were estimated using KR-21, to be .73 and .82, respectively. The duration of each test was 30 minutes.

3.2.2. Listening Texts

Thirty-three audio passages whose genres were conversation, lecture, and news were utilized in this study. The conversations were extracted from the book TOP NOTCH 2, Longman series, which is designed for intermediate proficiency level learners. The conversations covered a wide range of topics such as food, personality, art, technology, ethics and moral values, greetings, movies, and hotels. The duration of the conversations was between 00:40″ and 03′:06″. The other two genres, lectures and news, were level one. The lectures and the news were selected and downloaded from www.irlanguage.com and www.voanews.com, respectively. The lectures, which included topics such as pace of life, business innovation, MTV, celebrity news, mass communication, asleep, cultural geography, and fairy tales, lasted from 06′:31″ to 08′:02″. The news, the topics of which were about New York city, the world's biggest library, the world's oldest barber, the young magician, Disney family museum, the United States natural arboretum, the Bog turtle, and dinosaurs, lasted from 01′:54″ to 04′:07″.

3.2.3. Multimedia Glosses

In each listening passage, there were 3-11 unfamiliar words that were glossed using Microsoft PowerPoint. The unfamiliar words were glossed in three ways: pictorial, textual, and textual-pictorial. As the participants listened to different text types, the transcriptions in which the glossed words were underlined would appear on the video projector screen. By clicking on the underlined words, a new

window would appear on the screen. The pictorial group members, who listened to news texts, were provided with the pictures of unfamiliar words. The pictures were taken from the Internet. The participants in the textual group were provided with the definitions of glossed words of conversation texts. The definitions were selected from Oxford Advanced Learner's Dictionary (2010). The textual-pictorial group members, who listened to the lectures, received integration of picture and definition after clicking on the underlined words. Table 1 shows the number of glossed words in each group.

Table 1. *Number of Glossed Words in each Group*

Pictorial	Textual	Textual-pictorial
68	64	66

2.3.4. Vocabulary Pre-test

A vocabulary pre-test was administered to the participants prior to the treatment in each group. The vocabulary pre-test included 90 words. The participants were provided with sentences in which these words were underlined. They were required to write the Persian equivalents of the underlined words. The aim of the vocabulary pre-test was to omit the familiar words and hyperlink the words that students did not know. The duration of the vocabulary pre-test was 30 minutes.

3.3. Procedure

The present study was conducted at Rasa English Institute in Tehran. One hundred and fifteen male EFL learners took part in this study. In order to establish the homogeneity of the participants in terms of their listening comprehension, the standard listening test of PET was administered to them. They were required to answer 25 questions in 30 minutes. Meanwhile, each item

was played twice. After the scores of the listening test were obtained, based on their scores, 97 participants whose scores fell between one standard deviation above and below the mean were selected. Then, they were randomly assigned to three groups, namely pictorial, textual, and textual-pictorial glossing. Meanwhile, three other participants were excluded at the end of the treatment because they did not participate in the listening post-test. The study lasted for one month, and the participants attended classes three times a week. Each session lasted about 30 minutes.

The participants in the pictorial group were provided with eight news files whose topics were about New York city, the world's biggest library, the world's oldest barber, the young magician, Disney family museum, the United States natural arboretum, the Bog turtle, and dinosaurs. The news files were downloaded from www.voanews.com, and their duration was between $01':54''$ and $04':07''$. The participants in the textual group were supplied with 17 conversations relating to themes such as food, personality, art, technology, ethics and moral values, greetings, movies, and hotels. Due to the fact that some of the conversations were not long enough lasting about $00:40''$, the participants were required to listen to two or sometimes three different short conversations in each session. Finally, the textual-pictorial group was provided with some lectures on the following topics: the pace of life, business innovation, MTV, celebrity n news, mass communication, asleep, cultural geography, and fairy tales. The lectures lasted from $06':31''$ to $08':02''$. Therefore, to make the length of lectures equal to the other two genres, the participants were required to listen to the first $02':40''$ to $03':26''$ of these lectures.

Prior to this treatment, the participants in all groups were given a vocabulary pre-test, including 90 sentences. They were required to write the Persian equivalents of the underlined words in 30 minutes. All the words that turned out to be already familiar to the participants were excluded from the treatment. In

other words, they were not hyperlinked. Then, the participants received treatment for eight subsequent sessions. For the first time, they only listened to the listening task, while for the second time, as they listened, the transcription of the text in which the glossed words were underlined appeared on the video projector screen. As the speaker mentioned the glossed words, the listening task was paused, and the underlined words were clicked on. The pictorial group was provided with the picture of the glossed words, the textual group was given the definition of the glossed words, and the textual-pictorial group received integration of picture and definition of the glossed words. Meanwhile, the participants in all three groups were required to provide a short summary of what they had already heard. The purpose of this was to make sure that they paid attention to the listening tasks and that they did not simply pretend to be listening. At the end of the treatment period, all three groups of participants were required to take another standard listening test of PET as a listening post-test.

The participants' scores on the listening posttest were summarized and submitted to statistical analysis. To investigate the effect of different types of multimedia glosses on L2 listening comprehension, a One-Way ANOVA procedure was used.

4. Results

The research question sought to investigate whether or not there are significant differences among the effects of different types of multimedia glosses on L2 listening comprehension. To this end, a One-Way ANOVA procedure was used. Descriptive statistics, including the mean, standard deviation, etc. are summarized in Table 2.

Table 2. *Descriptive Statistics for the ANOVA on Listening Comprehension*

	N	Mean	Std. Deviation

Pictorial	32	18.53	4.273
Textual-pictorial	31	22.16	3.751
Textual	31	19.81	4.377
Total	94	20.15	4.370

Table 2 indicates that the highest mean on the listening post-test belongs to the textual-pictorial group, followed by the textual group. The lowest mean belongs to the pictorial group. To see whether or not the observed differences among the means of the three groups are statistically significant, the One-Way ANOVA procedure was used. The obtained results are presented in Table 3.

**Table 3.** *ANOVA Results on Learners' Listening Comprehension*

	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	212.914	2	106.457	6.198	.003
Within Groups	1563.001	91	17.176		
Total	1775.915	93		$\omega^2 = .23$	

In Table 3, the observed F value and the significance level ($F_{(2,91)}=6.198$, P<.01) indicate that there are significant differences among the three multimedia groups. Meanwhile, the index of the strength of association ($\omega^2=.23$) is indicative of relatively large effect size. To locate the significant differences, a post hoc Scheffe test was used, the results of which are summarized in Table 4.

Table 4. *Multiple Comparisons for the ANOVA on Listening Comprehension*

Gloss type	Gloss type	Mean Difference (I-J)	Sig.
Pictorial	Textual-pictorial	-3.630[*]	.003
Pictorial	Textual	-1.275	.477
Textual-pictorial	Textual	2.355	.088

As it can be seen in Table 4, there are statistically significant differences between the textual-pictorial group and the pictorial group. In other words, the textual-pictorial group has outperformed the pictorial group. This means that textual-pictorial glosses can positively influence L2 listening comprehension.

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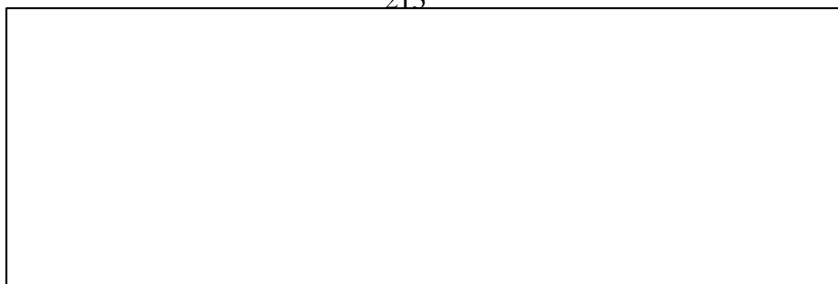
The graphic representation of the results makes this more clearly understandable.
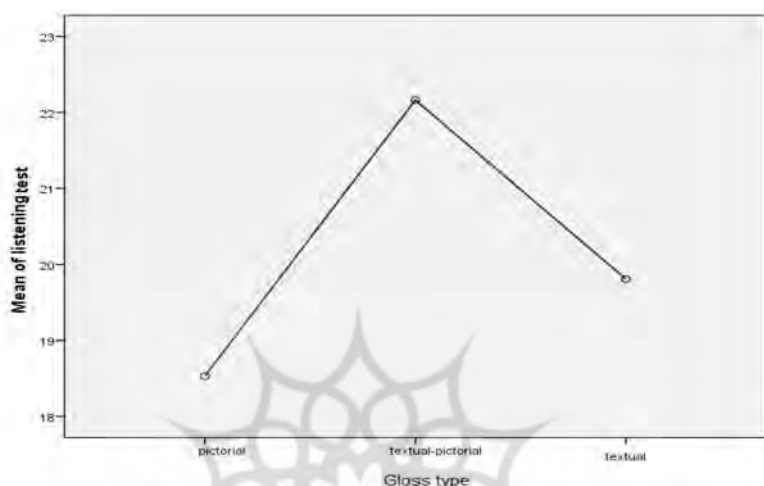
Graph 1. *Means Plot on Listening Comprehension*

4.1. Discussion

The result of this study showed significant differences between the textual-pictorial and pictorial glosses. In fact, the textual-pictorial glosses turned out to be more effective on L2 listening comprehension than pictorial glosses. The result obtained in the present study agrees with the findings of Yoshii and Flaitz (2002) as well as Yeh and Wang (2003), suggesting that the textual-pictorial annotations have a more positive effect on reading comprehension. In addition, in a study on the impact of different multimedia glosses on vocabulary learning and text comprehension, Yanguas (2009) found that the textual-pictorial group outperformed the other two groups. On the contrary, Zarei and Mahmoodzadeh (2014) concluded that there were no significant differences among the glossed groups in reading comprehension and vocabulary production. Further evidence against this finding of the present study comes from Yanguas (2009), who reported no significant differences among the four glossing groups in vocabulary

production. Meanwhile, Al-Seghayer (2001) concluded that text-video glosses were more effective than text-picture glosses.

The superiority of textual-pictorial glosses over pictorial glosses can be theoretically justified based on the tenets of the Dual Coding Theory, according to which input that is received through more than one channel is more likely to be processed and internalized than the input that comes through a single channel. In fact, exposing learners to a combination of pictures and text would result in better processing of vocabulary as learners use both verbal and visual systems. This claim of the dual coding theory is further corroborated by the finding that the difference between the textual gloss and pictorial gloss groups is not statistically significant. Meanwhile, the means plot of the groups clearly shows that the performance of the textual-pictorial gloss group is better than that of both pictorial and textual groups, suggesting that the combination of these two types of glossing is more effective on listening comprehension that either of the glossing types alone.

The findings of this study also appear to lend support to the cognitive theory of multimedia learning, which envisages five cognitive processes in the process of multimedia learning. The first process is selecting relevant words or ideas from the presented text; the second one involves selecting relevant pictures from among the presented illustrations; the third process includes organizing the selected words into a somewhat coherent verbal representation; the fourth one would require organizing the pictures into a pictorial representation; and the final process involves integrating prior knowledge and the pictorial and verbal representations. In simple terms, as Zarei and Abbasi (2013) point out, integrating visual and textual information may lead to a higher and deeper level of processing.

The findings could also be justified on the basis of the fact that there may be individual differences among learners with regard to their learning style. Some

learners may be more auditory in their learning, and others might have a dominant visual style of learning. In other words, a specific group of learners may benefit from either the textual or pictorial glosses. This means that providing integration of pictures and text will probably be beneficial for a larger number of learners with various learning styles.

Of course, there were also differences between certain aspects of the findings of this study and that of other similar studies. These differences may be partially attributable to the characteristics of the participants and the context of research. For example, in the study conducted by Zarei and Mahmoodzadeh (2014), the participants were female students, and Al-Seghayer's (2001) experiment was conducted with a number of ESL university students. However, the present study was carried out with a group of male EFL learners at a language institute. This implies that there may be many other factors that may influence the effectiveness of different types of multimedia glosses on listening comprehension. For the sake of manageability, this study focused only on the type of multimedia glosses. The interested researcher is advised to include one or more of the relevant factors to, hopefully, come up with more reliable and more generalizable findings.

5. Conclusion

The finding of this study showed that textual-pictorial glosses were more effective than pictorial glosses on L2 listening comprehension. This can lead to the conclusion that teachers need to bring variety to the classroom context. In fact, the source of input needs to be different. Teachers should not focus on a single source of input such as course books. In order to motivate learners, teachers can provide them with different sources of input such as learning games, photo stories, posters, and flashcards, in which learners have access to both text and picture. Meanwhile, it can be concluded that providing integration of picture

and text might be beneficial for those learners who have difficulty comprehending the definition of new words, and who have different learning styles. Therefore, textual-pictorial glosses can facilitate the second language learning process and increase learners' interest as well.

The findings of the present study can have both theoretical and pedagogical implications for language learning. From a theoretical perspective, the findings of this study seem to lend support to the tenets of the dual-coding theory and the cognitive theory of multimedia learning the basic premise of which is that when information is presented through more than one channel, better learning opportunities can be provided for learners.

From a practical perspective, the finding of this study can have implications for teachers, learners, as well as materials developers. This finding may help both teachers and materials developers to make more informed decisions as to how materials should be presented to learners. The finding may also guide learners to make better choices of materials for their self-study or to adapt alternative learning strategies allowing for the integration of textual and pictorial modalities.

A word of caution is warranted here. For practical reasons, the experimental period in this study was limited to 12 sessions, and the treatment was given in only eight sessions. Moreover, in each session, only 30 minutes of the class time was allocated to the treatment. This was due to the limitations imposed by the institute manager/owner. Nevertheless, there is no denial of the fact that this limitation could influence the generalizability of the findings. Acknowledging this limitation, we suggest that other researchers replicate this study with longer treatment periods.

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